

REMARKS:

This reply is responsive to the office action dated July 22, 2004.

The Office Action of July 22, 2004, has been carefully considered. Upon entry of this amendment, claims 1-4, 7-23, 25 and 26 are pending in this application; claims 1 and 3 having been amended; claims 5, 6 and 24 have been cancelled; claims 12-23 and 25 have been withdrawn; and new claim 26 has been added. No new matter has been added, and support for new claim 26 is contained in the specification as filed. The present application is believed to be in condition for allowance.

In the office action, the examiner:

- withdrew the earlier-indicated allowability of claims 6 and 8 in view of further consideration of the references of record and newly discovered reference U.S. Patent No. 5,316,604 to Fell ("the Fell patent");
- rejected claims 1-4 and 8-11 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,550,051 to Spielau et al. ("the Spielau patent") in view of U.S. Patent No. 4,368,234 to Palmer ("the Palmer patent"), and the Fell patent;
- rejected claims 1-4 and 7 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,451,528 to Krause ("the Krause patent") in view of the Palmer and Fell patents

Rejections Under 35 U.S.C. §103(a)

The Spielau, Palmer and Fell Patents

The examiner rejected claims 1-4 and 8-11 under 35 U.S.C. § 103(a) as being unpatentable over the Spielau patent in view of the Palmer patent and the Fell patent.

Applicant respectfully disagrees with the examiner's rejections of claims 1-4 and 8-11 as being unpatentable over the Spielau patent in view of the Palmer and Fell patents.

No Motivation to Combine

Specifically, the examiner has impermissibly combined the Palmer patent with the Spielau patent because the examiner has not adduced a proper "motivation to combine the two references." Fell likewise does not provide the required motivation. As such, applicant believes that the examiner has not carried the required initial burden for establishing a *prima facie* case of obviousness. See MPEP §2143 ("[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation ... to modify the reference or to combine reference teachings."); see also *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998) (without a motivation to combine, a rejection based on a *prima facie* case of obviousness is improper). Furthermore, the teaching or suggestion to make the claimed combination must be found in the prior art, and not based on the applicant's disclosure. See *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

The examiner noted that it would have been obvious at the time the invention was made to a person having ordinary skill in the art to attach the laminate of Spielau to a substrate and provide it with a mechanical fastener to form a joint "with the motivation of producing an article that is resistant to catastrophic failure or damage from shock or hard local impact as disclosed by Palmer." However, nowhere in the Spielau patent is it stated that one of the objectives is to provide an article that is resistant to catastrophic failure or damage from shock or hard local impact, and thus there would be no reason for the artisan to go looking for such a reference (e.g. the Palmer patent).

Rather, the stated object of the Spielau patent is to provide "a laminate employing epoxy resin with the advantages of the glass-fiberreinforced [sic] epoxy resin laminates, such as high flexural strength, surface resistance, volume resistivity, electric arc stability, blister formation resistance, bonding strength, low water absorption, low dielectric constant, low dissipation factor, and optionally nonflammability ... to reduce the expenses for a laminate based on epoxy resin with properties approaching those of glass-fiber-reinforced epoxy resin laminates." (See the Spielau patent, col. 2, lines 10-

31). The Spielau patent is directed to a laminate or multilayered composite structure for printed circuits, and there is no mention of a need or desire in the Spielau patent to produce a structure that is resistant to catastrophic failure.

No Suggestion of Desirability of Combination

Furthermore, simply the fact that the references *can* be combined is not sufficient to establish *prima facie* obviousness unless the prior art also suggests the desirability of the combination. See *In re Mills*, 916 F.2d 680 (Fed. Cir. 1990). The Palmer patent is directed to a substantially different composite material as compared to that of the Spielau patent, and thus it would not have been obvious to one of ordinary skill in the art to have combined the teachings of the Palmer patent with the Spielau patent to achieve applicant's invention. The Palmer patent discloses a woven material, in which a portion of the high modulus fibers such as carbon in a high modulus high strength woven material are replaced by bands of low modulus fibers (e.g. fiberglass) to form alternate bands or strips of high modulus fibers and adjacent bands or strips of low modulus fibers within the same layer. (See the Palmer patent, col. 2, lines 31-37 and Fig. 1). Thus, in a woven material having graphite strips and fiberglass strips in the 0° warp direction, when the resulting panel is highly loaded in the 0° warp direction and damage in the form of a crack occurs in the graphite area, such a crack will propagate and stop at the edge of the low modulus fiberglass strips, and prevent or postpone further damage or catastrophic failure of the panel. (See *id.*, col. 3, lines 1-10). Further, attachment holes placed in the low modulus strips do not reduce the mechanical properties of the article and hence it is possible to pierce the layered article in those zones containing the low modulus fibers in order to attach rivets, hinges and the like, without damaging the physical and mechanical properties of the high modulus fibers. (See *id.*, col. 3, lines 14-18). A plurality of layers of woven material of this type can be laid up layer on top of layer and oriented so that the fiberglass (low modulus) strips or bands **14** of alternating layers are in vertical alignment with each other, thus facilitating the making of perforations through the vertically aligned low modulus strips **14** for the

attachment of rivets and other fasteners . (See *Id.*, col. 3, lines 59-67 and Figs. 2 and 3). Thus, the Palmer patent discloses that fastener holes are placed only through the low-modulus bands **14** of the respective layers, and not through the high-modulus portions. Thus, there is no disclosure, teaching or suggestion in the Palmer patent that placing fastener holes through alternating layers of high-modulus and low-modulus portions would be desirable. Again, applicant notes that the teaching or suggestion to make the claimed combination must be found in the prior art, and not based on the applicant's disclosure. See *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

Thus, it is applicant's position that the examiner has not carried the initial burden of establishing a *prima facie* case of obviousness, and as such, applicant requests that this rejection be withdrawn and that claims 1-4 and 8-11 be allowed.

The Krause, Palmer and Fell Patents

The examiner rejected claims 1-4 and 7 under 35 U.S.C. § 103(a) as being unpatentable over the Krause patent in view of the Palmer patent and the Fell patent.

Applicant respectfully disagrees with the examiner's rejections of claims 1-4 and 8-11 as being unpatentable over the Krause patent in view of the Palmer and Fell patents. Specifically, the examiner has impermissibly combined the Palmer patent with the Krause patent because the examiner has not adduced a proper motivation to combine the two references. Fell likewise does not provide the required motivation. Thus, applicant believes that the examiner has not carried the required initial burden for establishing a *prima facie* case of obviousness. See MPEP §2143 ("[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation ... to modify the reference or to combine reference teachings."); see also *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998) (without a motivation to combine, a rejection based on a *prima facie* case of obviousness is improper).

The examiner noted that it would have been obvious at the time the invention was made to a person having ordinary skill in the art to attach the laminate of Krause to a substrate and provide with a mechanical fastener to form a joint "with the motivation of producing an article that is resistant to catastrophic failure or damage from shock or hard local impact as disclosed by Palmer." However, nowhere in the Krause patent is it stated that one of the objectives is to provide an article that is resistant to catastrophic failure or damage from shock or hard local impact, and thus there would be no reason for the artisan to go looking for such a reference (e.g. the Palmer patent).

Rather, the Krause patent is directed to a high strength, low-weight composite fiber reinforced article. (See the Krause patent, col. 2, lines 36-38). Applicants note that the teaching or suggestion to make the claimed combination must be found in the prior art, and not based on the applicant's disclosure. See *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

Thus, it is applicant's position that the examiner has not carried the initial burden of establishing a prima facie case of obviousness, and as such, applicant requests that this rejection be withdrawn and claims 1-4 and 7 be allowed.

Additionally, applicants believe that the office action fails to establish a prima facie case of obviousness for the additional reason that all of the limitations of claims 1-4 and 7 are not taught or suggested by the Krause, Palmer or Fell patents. Even if one accepts the selection of these references and these features from the references, the rejection fails to meet the invention claimed as a whole.

Claim 1

Claim 1 recites, *inter alia*,

"A mechanically fastened composite joint, comprising:

- (a) a substrate material;
- (b) a multi-layered composite mechanically joined to said substrate material by at least one fastener, said composite including:
 - (i) a pair of resin-impregnated, fiber-containing layers, having a first toughness, and a first tensile modulus;

- (ii) a fiber-containing core layer having a second, greater toughness than said pair of resin-impregnated fiber-containing layers, and a second tensile modulus that is lower than said first tensile modulus, said fiber-containing core layer sandwiched between said pair of resin-impregnated, fiber-containing layers”

Neither the Krause, Palmer or Fell patents, either alone or in combination, disclose, teach or suggest the recited “... pair of ... fiber-containing layers, having ... a first tensile modulus ... [and] ... a fiber-containing core layer having ... a second tensile modulus that is lower than said first tensile modulus,” required by claim 1. Rather, the Kraus patent discloses a high-strength, low-weight composite fiber reinforced article comprising a member consisting of a first web comprised of a resin incorporating glass fibers, and a surface stratum comprised of a resin having high-strength graphite fibers in the resin. (See the Krause patent, col. 2, lines 36-44). Depending on the specific loading, graphite fiber reinforced layers can be embedded between or sandwiched between two overlying glass fiber-containing resin matrices. (See *id.*, col. 5, line 63 through col. 6, line 3). Thus, the Krause patent discloses a high strength, high modulus fiber-containing layer sandwiched between layers of lower strength, lower modulus, glass fiber-containing layers.

As previously noted, the Palmer patent discloses a woven material, in which a portion of the high modulus fibers such as carbon in a high modulus high strength woven material are replaced by bands of low modulus fibers (e.g. fiberglass) to form alternate bands or strips of high modulus fibers and adjacent bands or strips of low modulus fibers within the same layer. (See the Palmer patent, col. 2, lines 31-37 and Fig. 1).

The Fell patent discloses the fabrication of honeycomb sandwich structures wherein facing sheets are applied to a fiber-reinforced core. (See the Fell patent, col. 1, lines 12-16). The Fell patent generally discloses a variety of materials that can be used

as core materials. (See *id.*, col. 4, lines 3-13). The facing sheets may be metal, fiber reinforced thermosetting resins or thermoplastics

Thus, neither the Krause, Palmer, or Fell patents, either alone or in combination, disclose, teach or suggest all of the limitations of claim 1. Therefore, applicant requests that the 35 U.S.C. § 103(a) rejection of claim 1 be withdrawn and that claim 1 be allowed. Regarding claims 2-4 and 7, which depend from claim 1 and which describe additional features of the invention, applicants request that these claims be allowed for the same reasons as stated for claim 1.

New Claim 26

New claim 26 has been added and recites, *inter alia*,

“... a composite material [comprising:]
(i) a pair of resin-impregnated, fiber-containing layers having a first toughness and a first tensile modulus; and
(ii) a fiber-containing core layer having a second, greater toughness than said pair of resin-impregnated fiber-containing layers, and a second tensile modulus that is lower than said first tensile modulus, said fiber-containing core layer sandwiched between said pair of resin-impregnated, fiber-containing layers; and
wherein said fiber-containing core layer acts to absorb shear energy generated when a force is applied to said composite material via the fastener

For the same reasons as discussed above in regards to independent claims 1 and 8, applicant believes that new claim 26 is likewise in condition for allowance.

In view of the above, reconsideration of this application is respectfully requested and an early notice of allowance is earnestly solicited.

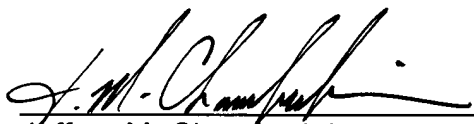
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The Commissioner is hereby authorized to charge any additional fees or credit any excess payment which may be associated with this communication to Duane Morris LLP Deposit Account 04-1670.

Respectfully submitted,

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Jeffrey M. Chamberlain
Registration No. 55,044

DUANE MORRIS LLP
P.O. Box 5203
Princeton, NJ 08540-5203
609-631-2491 tel
609-631-2401 fax